

# Supply chain and operations practice and performance in Chinese furniture manufacturing

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## Abstract

The relationship between supply chain/operations practice and operational/financial performance has been of interest to academics and practitioners for many years. We propose and develop a model exploring these connections, utilising data from a survey of 72 furniture manufacturers located throughout China. The industry is of particular interest in that, while labour productivity remains relatively low, exports have undergone substantial growth. Using a structural equation model (significant at  $p = 0.05$ ), we highlight the relative importance of supply chain and operations practices and show that the impact of practice on business performance is mediated by capabilities on operations dimensions.

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## 1. Introduction

China has emerged as a key player in global business, with 80% of the world's top 500 enterprises investing there (Powers, 2001) and North American companies regarding it as the most important market for expansion (Giffi, 2003). Exports in many sectors are expanding rapidly in many sectors, and in particular in the furniture industry, in which China now vies for the leading exporter position with Italy.

Supply chain management (SCM), dealing with material, financial, and information flows from raw material suppliers through to end consumers, is generally recognised as a key contributor to corporate performance, with practices being closely scrutinised by both practitioners and academics. In this regard, single-country, single-industry studies play a role in assessing the strength of these linkages without confounding national and industry effects.

Here we study practices and performance (operational and financial) relating to supply chain and operations management among 72 furniture manufacturers located throughout China. Supply chain activities covered include production and delivery strategy, inventory, forecasting, and enterprise

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software, as well as integration aspects related to interaction and communications with customers and suppliers. Operations areas include manufacturing technology and systems variables along with human resources issues. The study was conducted in 2001, immediately prior to World Trade Organization (WTO) accession. We exploit structural equation modelling (SEM) in the analysis. The paper complements and extends an earlier one which considered only manufacturing strategy/technology (i.e., without reference to supply chain practice) and moreover only employed correlation analysis (Robb and Xie, 2003).

Section 2 provides a background to SCM and furniture manufacturing in China, as well as highlighting previous findings on practice–performance relationships. Section 3 presents the initial conceptual model along with practice and performance construct and factor development. Section 4 describes the survey administration. Section 5 presents the results—both descriptive and inferential. After describing firm demographics, we provide performance and practice construct results, and then present and discuss the SEM development and results. Section 6 provides a conclusion, including managerial implications.

## 2. Literature review

By way of background, we discuss the rapidly developing field of SCM in China in Section 2.1, followed by a review of furniture manufacturing in China in Section 2.2, and an overview of SCM/operations management research in the furniture industry outside China in Section 2.3 (there is no known literature covering all three areas of SCM, the furniture industry, and Chinese manufacturing). In Section 2.4, we review some of the literature pertaining to the relationship between practice and performance in operations and SCM.

### 2.1. Supply chain management in China

Considerable attention is currently being placed on the rapid evolution in operations and supply chains in China, with the recent appearance of numerous consulting reports, special issues (Robb et al., 2007), commentaries (Flynn et al., 2007), and typologies (Zhao et al., 2006). The efficiency of supply chains in China is relatively low, with logistics and transportation costs comprising some 20% of GDP (Easton, 2002)—twice that of the US.

Distribution is hampered by inadequate infrastructure and a fragmented logistics industry (Ta et al., 2000), as well as geographical barriers, uneven economic development, and state-related operators privileged by monopolistic regulations at both national and regional levels (Jiang and Prater, 2002; Powers, 2001).

Notwithstanding these challenges, the industry is poised for considerable expansion, with trading restrictions having been removed subsequent to China's WTO admission, and the emergence of hypermarkets and large retailers (Shaw and Wang, 2002). A survey of 29 logistics companies in China (Dai et al., 2003) confirms this view, but also notes the constraints of regulatory issues, undeveloped warehousing, and the low penetration of logistics outsourcing among state-owned firms (which are themselves declining in number; Woetzel, 2004).

### 2.2. Furniture manufacturing in China

#### 2.2.1. Production and trade

The furniture industry in China has expanded at a compound annual growth rate of 15% since 1978, when the economic system began its transformation from a planned to a market economy. With annual production exceeding US\$20 billion and exports exceeding US\$5 billion, China is a major player in furniture manufacturing, comprising one-tenth of both global production and trade (Vignetti, 2003; Zhu and Wu, 2003).

Exports of Chinese furniture have risen dramatically in recent years, and are likely to continue with WTO membership securing equal treatment. Half of the exports are destined for the US, where they comprise almost half of US furniture imports and have led several dozen US furniture manufacturers to make claims of dumping. Although these assertions were disputed by US retailers and the *China National Furniture Association*—which argued that the average profit level on exports can be as high as 30% (Anon, 2003)—US regulators proposed tariffs ranging from 4.9% to 198% against 115 Chinese manufacturers of wooden bedroom furniture—which accounted for some 65% of imports to the US (Morse, 2004b). After a bitter battle, the US Department of Commerce, which had found that some 73,000 American furniture jobs had been eliminated between 2000 and the end of 2002, imposed tariffs averaging only 6.65% (Morse, 2004a; Normington, 2005; United States Department of Commerce, 2004).

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